

## WHAT IS CLAIMED IS:

1. A method for processing a print job comprising the steps of:
  - selecting an object in said print job;
  - determining whether said object has a match among previously processed objects; and
  - selectively incrementing a number of usages of said object based upon a result of said determining step.
2. The method of claim 1, wherein said print job comprises a page description language (PDL) file.
3. The method of claim 1, wherein said print job includes at least one of: a plurality of pages and a plurality of documents.
4. The method of claim 1, wherein said object is an image.
5. The method of claim 1, wherein said step of determining whether said object has a match among previously processed objects further comprises the steps of:
  - generating a signature associated with said object; and
  - comparing said signature with other signatures stored in an object table.

6. The method of claim 1, wherein said step of selectively incrementing said number of usages of said object based upon a result of said determining step further comprises the step of:

incrementing a value stored in an object reuse field of an object table.

7. The method of claim 1, wherein said step of selectively incrementing said number of uses of said object based upon a result of said determining step further comprises the step of:

adding a page number, which indicates where said object is used in said print job, to a list of page numbers associated with said object.

8. The method of claim 1, further comprising the step of:

caching said object based upon said number of usages.

9. The method of claim 1, further comprising the step of:

partitioning said print job based upon said number of usages.

10. The method of claim 9, further comprising the steps of:

grouping pages with common objects into a partition; and

balancing a number of pages between partitions.

11. The method of claim 1, further comprising the step of:  
  
transforming said object, prior to said step of determining, into a  
  
predetermined coordinate system and at least one predetermined sequence of rendering  
  
operations.
12. A system for processing a print job comprising:  
  
a processor for selecting an object in said print job and determining whether  
  
said object has a match among previously processed objects; and  
  
an object table for storing information associated with said print job, wherein  
  
said processor selectively increments a number of usages of said object based upon whether  
  
said object has said match.
13. The system of claim 12, wherein said print job comprises a page description  
  
language (PDL) file.
14. The system of claim 12, wherein said print job includes at least one of: a plurality  
  
of pages and a plurality of documents.
15. The system of claim 12, wherein said object is an image.

16. The system of claim 12, wherein said processor also generates a signature associated with said object and compares said signature with other signatures stored in said object table.

17. The system of claim 12, wherein said processor selectively increments said number of usages of said object by incrementing a value stored in an object reuse field of an object table.

18. The system of claim 12, wherein said processor selectively increments said number of uses of said object by adding a page number, which indicates where said object is used in said print job, to a list of page numbers associated with said object in said object table.

19. The system of claim 12, further comprising:  
a cache memory unit for caching said object based upon said number of usages.

20. The system of claim 12, wherein said processor partitions said print job based upon said number of usages.

21. The system of claim 20, wherein said processor grouping pages with common objects into a partition and balances a number of pages between partitions.

22. The system of claim 12, wherein said processor transforms said object, prior to said determining whether said match exists, into a predetermined coordinate system and at least one predetermined sequence of rendering operations.

23. A computer-readable medium containing a program that performs the steps of:  
selecting an object in a print job;  
determining whether said object has a match among previously processed objects; and  
selectively incrementing a number of usages of said object based upon a result of said determining step.

24. The computer-readable medium of claim 23, wherein said print job comprises a page description language (PDL) file.

25. The computer-readable medium of claim 23, wherein said print job includes at least one of: a plurality of pages and a plurality of documents.

26. The computer-readable medium of claim 23, wherein said object is an image.

27. The computer-readable medium of claim 23, wherein said step of determining whether said object has a match among previously processed objects further comprises the steps of:

generating a signature associated with said object; and  
comparing said signature with other signatures stored in an object table.

28. The computer-readable medium of claim 23, wherein said step of selectively incrementing said number of usages of said object based upon a result of said determining step further comprises the step of:

incrementing a value stored in an object reuse field of an object table.

29. The computer-readable medium of claim 23, wherein said step of selectively incrementing said number of uses of said object based upon a result of said determining step further comprises the step of:

adding a page number, which indicates where said object is used in said print job, to a list of page numbers associated with said object.

30. The computer-readable medium of claim 23, further comprising the step of:  
caching said object based upon said number of usages.

31. The computer-readable medium of claim 23, further comprising the step of:  
partitioning said print job based upon said number of usages.

32. The computer-readable medium of claim 31, further comprising the steps of:  
grouping pages with common objects into a partition; and

balancing a number of pages between partitions.

33. The computer-readable medium of claim 23, further comprising the step of:  
transforming said object, prior to said step of determining, into a  
predetermined coordinate system and at least one predetermined sequence of rendering  
operations.

34. A method for processing a print job comprising the steps of:  
selecting an object in said print job;  
transforming said object into a predetermined coordinate system and at least  
one predetermined sequence of rendering operations;  
generating a signature associated with said transformed object;  
determining whether said object has a match among previously processed  
objects by comparing said signature with previously stored signatures; and  
modifying reuse information associated with said object based upon a result of  
said determining step.

35. The method of claim 34, wherein said step of modifying reuse information  
further comprises the step of:  
selectively incrementing a number of usages of said object based upon a result  
of said determining step.

36. The method of claim 34, wherein said step of modifying said usage information further comprises the step of:

adding a page number, which indicates where said object is used in said print job, to a list of page numbers associated with said object.

37. The method of claim 34, further comprising the step of:

caching said object based upon said usage information.

38. The method of claim 34, further comprising the step of:

partitioning said print job based upon said usage information.

39. The method of claim 38, further comprising the steps of:

grouping pages with common objects into a partition; and  
balancing a number of pages between partitions.

40. The method of claim 34, wherein said step of transforming further comprises the steps of:

translating operation coordinates of said object relative to a predetermined point; and

rotating operations associated with rendering said object into a predetermined order.



41. The method of claim 34, wherein said step of transforming further comprises the steps of:

reversing an order of said operations into a predetermined order.

42. A system for processing a print job comprising:

a processor for selecting an object in said print job, transforming said object into a predetermined coordinate system and at least one predetermined sequence of rendering operations and generating a signature associated with said transformed object; and

an object table for storing object signatures, wherein said processor determines whether said object has a match among previously processed objects by comparing said signature with previously stored signatures; and

wherein said processor modifies reuse information associated with said object based upon whether said match exists.

43. The system of claim 42, wherein said processor modifies said reuse information by selectively incrementing a number of usages of said object based upon whether said match exists.

44. The system of claim 42, wherein said processor modifies said usage information by adding a page number, which indicates where said object is used in said print job, to a list of page numbers associated with said object.

45. The system of claim 42, further comprising:

a caching unit for caching said object based upon said usage information.

46. The system of claim 42, wherein said processor partitions said print job based upon said usage information.

47. The system of claim 46, wherein said processor groups pages with common objects into a partition and balances a number of pages between partitions.

48. The system of claim 42, wherein said processor transforms said object by translating operation coordinates of said object relative to a predetermined point and rotating operations associated with rendering said object into a predetermined order.

49. A system for processing a print job comprising:

means for selecting an object in said print job;

means for determining whether said object has a match among previously processed objects; and

means for selectively incrementing a number of usages of said object based upon a result of said determining step.

50. The system of claim 49, further comprising: \

means for transforming said object into a predetermined coordinate system and at least one predetermined sequence of rendering operations; and

means for generating a signature associated with said transformed object, wherein said means for determining whether said object has a match among previously processed objects compares said signature with previously stored signatures.

51. A method for partitioning a print job into N partitions comprising the steps of:

generating an object usage list for each page in said print job;

linking together each pair of page nodes having at least one common

object;

assigning a link weight to each link; and

generating N partitions of said pages based upon said link weights.

52. The method of claim 51, wherein each of said N partitions has substantially the same number of pages.

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53. The method of claim 51, wherein said step of assigning a link weight further comprises the step of:

assigning said link weight based upon a number of common objects shared by each pair of page nodes.

54. The method of claim 51, wherein said step of assigning a link weight further comprises the step of:

assigning said link weight based upon a size of common objects shared by each pair of page nodes.

55. The method of claim 51, further comprising the step of:

routing each of said N partitions to a different one of N rasterizing image processors (RIPs).

56. The method of claim 51 wherein said step of generating N partitions of said pages based upon said link weights further comprises the steps of:

(a) selecting a link having a greatest link weight;

(b) merging nodes associated with said selected link together to generate a merged node, if merging said nodes does not violate at least one predetermined condition;

(c) otherwise selecting a link having a next greatest link weight and repeating step (b);

(d) moving said merged node to a partition complete list if a number of pages in said merged node is equal to a maximum partition size; and

(e) otherwise recomputing said link weights and repeating steps (b)-(d).

57. The method of claim 56, wherein said at least one predetermined condition is that a number of pages in said nodes can not be greater than a maximum partition size.

58. The method of claim 56, wherein said at least one predetermined condition is that a number of clusters can not exceed a number of partitions to be created, wherein a cluster is a merged node containing more than one page in its page list.

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